CLAIMS

What is claimed is:

1. A mixer, comprising:

a differential amplifier for receiving and amplifying input signals, the amplifier stage providing a predetermined gain to the input signals;

a load for providing a load impedance;

a dual differential switching stage, coupled to the differential amplifier and the load, the dual differential switching stage mixing the amplified input signals from the differential amplifier with a local oscillator signal to produce an output signal at the load; and

a current modifier, coupled to the differential amplifier, the current modifier altering current in the differential amplifier to adjust current through the load.

2. The mixer of claim 1, wherein the current modifier comprises a current sink, coupled to the differential amplifier, the current sink drawing current from the differential amplifier to alter current through the load.

3. The mixer of claim 1, wherein the current modifier comprises a current source, coupled to the differential amplifier, the current source injecting current into the differential amplifier to reduce current through the load by supplementing current in the differential amplifier.

4. The mixer of claim 3, wherein the current source comprises a first and second current device, the first current device being coupled to a first transistor of the differential amplifier stage and the second current device being coupled to a second transistor of the differential amplifier stage.

5. The mixer of claim 4, wherein the current source reduces the current flowing through the load to enable a lower supply voltage.

6. The mixer of claim 3, wherein the current source reduces the current through the dual differential switching stage to allow a reduction in a local oscillator drive while providing substantially the same voltage drop through the dual differential switching stage.

7. The mixer of claim 3, wherein the current source allows an increase in a voltage across the differential amplifier while minimizing the supply voltage to provide better linearity and less distortion

8. The mixer of claim 1, wherein the differential amplifier comprises a first and second transistor differentially coupled having first electrodes joined at a common node.

9. The mixer of claim 8, wherein the first electrodes comprise sources of the first and second transistors of the differential amplifier.

10. The mixer of claim 8, wherein the first electrodes comprise sources of the first and second transistors of the differential amplifier.

11. The mixer of claim 8, wherein the dual differential switching stage comprises a first differential transistor pair having first electrodes coupled at a first common connection and a second differential transistor pair having second electrodes coupled at a second common connection, the first common connection being coupled to a second electrode of the first transistor of the differential amplifier and the second common connection being coupled to a second electrode of the second transistor of the differential amplifier.

12. The mixer of claim 11, wherein the first electrodes of the first differential transistor pair comprise sources, the second electrodes of the second differential transistor pair comprise sources, the second electrode of the first transistors of the differential amplifier comprises a drain and the second electrode of the second transistors of the differential amplifier comprises a drain.

13. The mixer of claim 11, wherein the first electrodes of the first differential transistor pair comprise source electrodes, the second electrodes of the second differential transistor pair comprise source electrodes, the second electrode of the first transistors of the differential amplifier comprises a drain electrode and the second electrode of the second transistors of the differential amplifier comprises a drain electrode.

14. The mixer of claim 1, wherein the dual differential switching stage comprises a first differential transistor pair having first electrodes coupled at a first common connection and a second differential transistor pair having second electrodes coupled at a second common connection.

15. The mixer of claim 14, wherein the first electrodes and second electrodes comprise source electrodes.

16. The mixer of claim 14, wherein the first electrodes and second electrodes comprise source electrodes.

17. The mixer of claim 1, wherein the dual differential switching stage comprises first and second differential pairs, the first and second differential pairs having output electrodes cross coupled.

18. A mixer, comprising:

a Gilbert cell comprising an RF amplifier stage and a mixer stage; and

a current modifier, coupled to the differential amplifier, the current modifier altering current in the differential amplifier to adjust current through the load.

19. The mixer of claim 18, wherein the current modifier comprises a current sink, coupled to the RF amplifier stage, the current sink drawing current from the RF amplifier stage to alter current through the load.

20. The mixer of claim 18, wherein the current modifier comprises a current source, coupled to the RF amplifier stage, the current source injecting current into the RF amplifier stage to reduce current through the load by supplementing current in the RF amplifier stage.

21. The mixer of claim 20, wherein the current source comprises a first and second current device, the first current device being coupled to a first transistor of the amplifier stage and the second current device being coupled to a second transistor of the differential amplifier stage.

22. The mixer of claim 21, wherein the current source reduces the current flowing through the load to enable a lower supply voltage.

23 The mixer of claim 18, wherein the current source reduces the current through the mixer stage to allow a reduction in a local oscillator drive to the mixer stage while providing substantially the same voltage drop through the mixer stage.

24. The mixer of claim 18, wherein the current source allows an increase in a voltage across the amplifier stage while minimizing the supply voltage to provide better linearity and less distortion.

25. The mixer of claim 18, wherein the dual differential switching stage comprises first and second differential pairs, the first and second differential pairs having output electrodes cross coupled.

26. A method for mixing two signals, comprising:

providing a Gilbert cell comprising an RF amplifier stage and a mixer stage; and

injecting current into the amplifier stage to reduce current through the mixer stage by supplementing current in the amplifier stage.

27. A method for mixing two signals, comprising:

providing a Gilbert cell comprising an RF amplifier stage and a mixer stage; and

sinking current from the amplifier stage to alter current through the mixer stage.

28. A mixer, comprising:

means for amplifying an input signal;

means for receiving the amplified input signal and for providing a balanced differential output signal having a first frequency translated using the frequency of the amplified input signal; and

means, coupled to the means for amplifying, for injecting current into the means for amplifying to reduce current through the means for receiving the amplified input signal and for providing a balanced differential output signal by supplementing current in the means for amplifying.

29. A mixer, comprising:

means for amplifying an input signal;

means for receiving the amplified input signal and for providing a balanced differential output signal having a first frequency translated using the frequency of the amplified input signal; and

means, coupled to the means for amplifying, for sinking current from the means for amplifying to alter current through the means for receiving the amplified input signal and for providing a balanced differential output signal.